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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/609,494	06/30/2000	Manuvir Das	777.383US1	1489

27488 7590 02/09/2004

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EXAMINER

ZHEN, WEI Y

ART UNIT PAPER NUMBER

2122

DATE MAILED: 02/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PR4

Office Action Summary	Application No. [REDACTED]	Applicant(s)	
	09/609,494	DAS ET AL.	
	Examiner	Art Unit	
	Wei Y Zhen	2122	

-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-18, 25-36 and 42-49 is/are allowed.
- 6) ☒ Claim(s) 19, 20, 24, 37-41 and 50-56 is/are rejected.
- 7) ☒ Claim(s) 21-23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>2</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-56 are pending.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 37-41 and 50-56 are rejected under 35 USC because the claimed inventions are directed to non-statutory subject matter.

As to claims 37-41, merely claimed as “a data structure” comprising various fields, types without creating any functional interrelationship, either as part of the stored data or as part of the computing processes performed by the computer (“acts”), then such descriptive material alone does not impart functionality either to the data as so structured or to the computer. Thus, such “descriptive material”, non-functional descriptive material, that cannot exhibit any functional interrelationship with the way in which computing processes are performed does not constitute a statutory process, machine, manufacture or composition of matter. The purely non-functional descriptive material cannot alone provide the practical application for the manufacture.

Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760. **In re Sarkar**, 588 F.2d 1330, 1333, 200 USPQ 132, 137 (CCPA 1978). *See Examination Guidelines for Computer-Related Inventions- Final Version*, page 10. *See M.P.E.P. PP 2106(IV)(B)(1)(b)*.

As to claims 50-56, merely claimed as “a graph” that merely comprising various nodes, Lines, without creating any functional interrelationship, either as part of the stored data or as part of the computing processes performed by the computer (“acts”), then such descriptive material

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alone does not impart functionality either to the data as so structured or to the computer. Thus, such “descriptive material”, non-functional descriptive material, that cannot exhibit any functional interrelationship with the way in which computing processes are performed does not constitute a statutory process, machine, manufacture or composition of matter. The purely non-functional descriptive material cannot alone provide the practical application for the manufacture. **Warmerdam**, 33 F.3d at 1361, 31 USPQ2d at 1760. **In re Sarkar**, 588 F.2d 1330, 1333, 200 USPQ 132, 137 (CCPA 1978). See Examination Guidelines for Computer-Related Inventions-Final Version, page 10. See M.P.E.P. PP 2106(IV)(B)(1)(b).

Claims 19 - 24 and 25 - 30 merely define a template for data structures/graph and Their contents. Because they are non-functional (without functional interrelationship) and do not comprise of any computing processing activity, therefore, they are considered non-statutory subject matter.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 19-20 and 24 are rejected under 35 U.S.C. 102(a) as being anticipated by Ruf.

As per claim 19, Ruf discloses

Abstracting program expressions into types (col. 7 lines 55 to col. 8 line 6);

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Forming a type graph from the types, wherein the type graph includes polarities and indices so as to enhance flow analysis (Fig. 5A and 5B and col. 11 lines 29 to col. 13 line 37).

As per claim 20, the rejection of claim 19 is incorporated and further Ruf discloses forming a plurality of nodes, wherein each node represents a type (Fig. 5A and 5B).

Claim 24 is rejected on the reason set forth in the rejection of claim 19.

Allowable Subject Matter

4. Claims 1-36, 42-49 are allowed.

The cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, forming a flow graph from the type graph so as to enhance context-sensitivity of flow analysis as recited in independent claims 1, 6; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, forming a flow graph that includes a set of flow paths, wherein the set of flow paths excludes imprecise paths so as to enhance context-sensitivity of flow analysis as recited in independent claims 7, 12; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, forming a plurality of instantiation paths to represent instantiations of generic types to instance types, wherein each instantiation path includes an index and a polarity as recited in independent claims 13, 18; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, solving the constraints to infer at least one type, wherein solving includes propagating polarities so as to enhance flow analysis as recited in

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independent claims 25, 30; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, tracing at least one path on a type graph having polarities to determine if a value arising at least one label in the program flow to another label in the program as recited in independent claims 31, 32; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, computing points-to information for at least one program point by answering reach ability queries on the type instantiation graph as recited in independent claims 33, 36; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, forming a subset from the set of flow paths such that context-sensitivity of flow analysis is enhanced as recited in independent claims 42, 49.

5. Claims 21-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, forming at least one instantiation path between two nodes to represent an instantiation of a generic type to an instance type as recited in claim 21; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, abstracting includes unifying recursive types, wherein unifying is adapted to be executed using a cyclic unification technique as recited in claim 23. Claim 22 depends on claim 21 and contains the same allowable subject matter as claim 21.

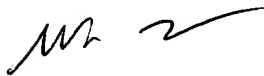
Conclusion

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6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wei Y Zhen whose telephone number is (703) 305-0437. The examiner can normally be reached on Monday-Friday, 8 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam can be reached on (703) 305-4552. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Wei Zhen
Primary Examiner
2/5/2004